PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant(s):	John F. Breedis Ronald N. Caron	Docket No : 102134-100
Serial No. :	09/865,184	Examiner : Sikyin Ip
Filed :	May 24, 2001	Art Unit : 1742
		Conf. No.: 2996
For :	NICKEL CONTAINING HIGH COPPER ALLOY	

#9

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Mail Stop AF Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

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APPEAL BRIEF FOR JOHN F. BREEDIS ET AL.

Dear Sir:

This is an appeal from the Final Rejection dated August 27, 2002, in which claims 1 to 11 and 21 to 24 of the above-identified application were finally rejected, as confirmed in the Advisory Action mailed on March 6, 2003.

Please charge the amount of Three Hundred and Twenty Dollars ($320.00) to Wiggin & Dana's Deposit Account No. 23-1665 to cover the filing fee for this Appeal Brief. If there are any additional charges associated with this Appeal Brief, please charge them to Deposit Account No. 23-1665.

This brief is submitted in triplicate.

REAL PARTY IN INTEREST

The real party in interest for the above-identified application is Olin Corporation, Inc., by virtue of an assignment from the above-identified Appellants recorded in the Patent and Trademark Office on May 24, 2001 on Reel No. 011852, Frame No. 0816.

STATUS OF RELATED APPLICATIONS

The above-identified application is an original application, and there are no related applications.

STATUS OF CLAIMS

Claims 1-11 are all of the claims under consideration in the instant appeal. Claims 2 to 9 are as originally filed. Claims 1, 10 and 11 were amended in an Amendment mailed on May 14, 2002 and claims 1 and 10 were further amended in an Amendment mailed on February 21, 2003. There are no other claims on appeal. Claims 12-24 were canceled in the Amendment mailed on February 21, 2003.

STATUS OF AMENDMENTS

A Response to Final Rejection was filed under a Certificate of Mailing dated February 21, 2001. This Response to Final Rejection was considered and entered, as indicated in the Advisory Action mailed on March 6, 2003. A Notice of Appeal, received on February 27, 2003 and filed under a Certificate of Mailing dated February 21, 2003, was also filed in response to the Final Rejection.

SUMMARY OF THE CLAIMED INVENTION

The present claimed invention is directed to a copper alloy having enhanced resistance to stress relaxation consisting essentially of selected amounts of iron, nickel, tin, phosphorous and zinc with the balance being copper and inevitable impurities,

said copper alloy having a relief anneal temper (claims 1 to 8 and 10) as well as copper alloys formed into electrical connectors (claims 9 and 11). Claim 10 further requires that the copper alloy have particular yield strength and electrical conductivity values.

The copper alloys of the present claims fall within a class of alloys called "high copper alloys", which are wrought copper alloys with a copper content of less than 99.3% but more than 96%. Known prior art members of one subset of this class included alloys containing amounts of iron, tin and phosphorous. This copper alloy of this prior art subset are characterized by high electrical conductivity, but relatively poor resistance to stress relation at temperatures exceeding 125°C (see page 2 of the present specification).

The presently claimed alloys of the present are a sub-subset of this class of high copper alloys. Specifically, the present invention is directed to copper alloys that broadly contain:

from 0.8% to 3% by weight of iron;
from 0.3% to 2% by weight of nickel;
from 0.6% to 1.4% of tin;
from 0.005% to 0.35% of phosphorous;
less than 0.2% of zinc; and
the balance copper and inevitable impurities.

The claimed copper alloys of the present invention claim are made by a processing sequence described on pages 6 and 7 and the Examples as well as Figure 1. This processing sequence included a Relief Annealing (RA) step. The resulting alloy has a desired relief anneal temper. See page 7, lines 14-17 and 19-21 as well as page 9, lines 9-11 and page 11, lines 11 to 18.

The claimed copper alloys of the present invention has several desirable properties not obtained by the above-noted prior art subset. They have enhanced resistance to stress relaxation (see claim 1) as well as having a yield strength of 70 ksi or higher, an electrical conductivity in excess of 40% IACS (see claim 10).

The claimed invention is illustrated by claim 1 on appeal. The full recitation of claim 1, together with the other claims on appeal, is provided in Appendix 1 appended hereto.

GROUPING OF CLAIMS

The claims on appeal should stand or fall together.

ISSUES ON APPEAL

The claims on appeal stand finally rejected under 35 U.S.C. §103(a) over three references. More specifically, claims 1-11 stand rejected under 35 U.S.C. §103(a) as obvious and unpatentable over Japanese Published Patent Application No. JP 11-264037 (date of publication September 28, 1999) or Japanese Published Patent Application No. JP 61-266540 (published on November 26, 1986), as recited in paragraphs 8 to 12 of the Final Rejection. Claim 10 stands additionally finally rejected under 35 U.S.C. §103(a) as being obvious over these two Japanese Published Patent Applications as applied above, and further in view of Knorr et al. (U.S. Patent No. 4,605,532) which issued on August 12, 1986), as recited paragraphs 13 and 14 of the Final Rejection.

Because claims 21-24 were cancelled in the entered Amendment of February 21, 2003, the rejection of those claims under 35 U.S.C. §112, second paragraph as recited in paragraphs 3 to 5 of the Final Rejection is rendered moot.

Also, since non-elected claims 12 to 20 were cancelled in the entered Amendment of February 21, 2003, the restriction requirement made final in paragraphs 1 and 2 of the Final Rejection has been rendered moot.

Copies of the three (3) cited references are attached hereto as Appendix 2 to 4. Included with a copy of JA 11-264037 in Exhibit 1 is a short abstract as well as a copy of the English translation that Appellants submitted in the IDS and Form 1449 dated May 24, 2001. Included with a copy of JA 61-26640 is a short abstract that the Patent Examiner included when citing this reference along with the first Office Action. The Examiner has not provided a full English translation of this second Japanese Published Patent Application. The Examiner is respectfully requested to do so if this application is not allowed and an Examiner's Answer is filed.

Accordingly, the Arguments below will be based on teachings in the full English translation of JA 11-264037 and the short English abstract of JA 61-266540.

ARGUMENTS

I. Applicable Law Relating to the Issue of Obviousness Versus Nonobviousness of the Present Invention

All three rejections of claims 1-11 are obviousness-type rejections. The underlying statutory law and case law is well-established.

A. Non-Obviousness Generally

Aside from being novel, an invention must also be unobvious to a person skilled in the art. 35 U.S.C. §103; *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). 35 U.S.C. §103(a) reads:

> "A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

To be patentable at the time of the claimed invention, a hypothetical person skilled in the art, having knowledge of the fields of art reasonably pertinent to the particular problem with which the inventor was involved, would have found it unobvious to combine that art to arrive at the invention. *In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979).

In other words, even though the prior art does not identically disclose or describe the claimed invention, one may not obtain a patent on the invention if the differences between the invention and the prior art are such that the claimed invention as a whole would have been obvious to the person of ordinary skill. The relevant time period for evaluating what the person skilled in the pertinent art would have considered obvious is just prior to when the invention was made.

The United States Supreme Court established the basic rules for analyzing obviousness in *Graham v. John Deere Co.,* 383 US 1, 148 USPQ 459 (1966).

Obviousness requires an inquiry into: (1) the scope and content of the prior art, (2) the difference between the prior art and the claimed subject matter, and (3) the level of ordinary skill in the art at the time the invention was created.

B. Graham Analysis

The *Graham* analysis also considers any objective evidence tending to show nonobviousness such as commercial success. This evidence is generally termed as "secondary considerations".

1) Scope and Content of the Prior Art

In ascertaining the scope and content of the prior art, one must first determine what constitutes legally cognizable prior art. In making this initial determination, one must consider the earliest effective date of publication or patent or the exact date of any alleged prior knowledge, use or sale to see if it "fits" into one or more subparagraphs of Section 102. In other words, section 102 establishes what qualifies as prior art for Section 103. Typically, a reference qualifies as prior art if it has an effective date before the date of invention (e.g. the filing date or an earlier substantiated date of invention) under 102(a) or the statutory bar date under 102(b). In the present situation, all three cited and applied references qualify as prior art under 35 U.S.C. §102(b) and can not be sworn behind.

2) Differences Between the Prior Art and the Claimed Invention

After having ascertained the scope and content of the prior art, an analysis of obviousness under *Graham* calls for examining the differences between the prior art and the claimed invention. This examination involves construing the claims at issue and comparing them to the prior art.

Each item of prior art is valid for everything it teaches, not just the invention it describes or claims. As stated in *EPW Corp. v. Reliance Universal, Inc.,* 225 USPQ 20, 25 (Fed. Cir. 1985): "A reference must be considered for everything it teaches by way of technology and is not limited to the particular invention it is describing and attempting to protect. On the issue of obviousness, the combined teachings of the prior art as a whole must be considered." However, as stated in *In re Wesslau,* 147 USPQ 391 (CCPA 1965): "it is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given

position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art."

3) Level of Ordinary Skill in the Art

The level of ordinary skill in the art represents the third factor in the *Graham* inquiry. Determining the issue of obviousness with respect to the hypothetical person of ordinary skill in the art at the time the invention was made forms the objective aspect of the inquiry.

Six factors have been identified as relevant to determining the level of skill in the art:

(1) educational level of the inventor;

(2) type of problems encountered in the art;

(3) prior art solutions to those problems;

(4) rapidity with which innovations are made;

(5) sophistication of the technology; and

(6) education level of active workers in the field.

4) Objective Indicia of Unobviousness

Objective indicia of unobviousness can supplement the prior three inquiries of *Graham*. They provide an indication of the economic and motivational issues tending to shed light on whether the skilled artisan would have found the modification obvious to do. These indicia of nonobviousness include:

(1) showing the critically or unexpected results of the invention;

(2) its resolution of a long-felt need;

(3) the failure of others to find a solution to the problem plaguing the art;

(4) its commercial success;

(5) the industry's acquiescence in the invention's result by licensing it;

(6) copying of the invention by others;

(7) the disbelief and acclaim by experts in the art of the invention's

success;

(8) admission of unobviousness by an adversary; and

(9) near simultaneous invention by others.

5) Consideration of the Claimed Invention as a Whole

In determining obviousness, section 103 expressly requires considering the claimed invention "as a whole". Focusing the section 103 inquiry on a particular aspect of the invention that differs from the prior art improperly disregards the "as the whole" statutory mandate. *Hybritech Inc. v. Monoclonal Antibodies, Inc.,* 802 F.2d 1367, 1375, 231 U.S.P.Q. 2d 81, 87 (Fed. Cir. 1986).

(a) The Properties and Advantages of the Invention Are Part of the Invention as a Whole

It is well established that a compound and its properties are inseparable. *In re Papesch,* 315 F.2d 381, 137 U.S.P.Q. 53 (C.C.P.A. 1963). Claimed compounds need not excel over the prior art compounds in every possible property, but unexpected activity in one of a spectrum of properties could suffice to show patentability. *In re Chubb,* 816 F.2d 643, 2 U.S.P.Q. 2d 1437 (Fed. Cir. 1987).

6) The Prior Art Must Provide a Basis for the Modification

The motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. *In re Napier,* 55 F.3d 610, 613, 34 U.S.P.Q. 2d 1782, 1784 (Fed. Cir. 1995). The Federal Circuit in *In re Fine,* 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988) insisted that "some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references".

7) Inherency of a Claimed Element or Advantage of an Invention is Immaterial in an Obviousness Context

While inherency may be used to defeat patentability in the context of an anticipatory rejection under Section 102, it cannot form a proper basis for rejecting the claimed invention as obvious under Section 103. *In re Shelty,* 566 F.2d 81, 86, 195 U.S.P.Q. 753, 756-57 (C.C.P.A. 1977).

These generally established legal principals are now applied to the present rejections.

II. Rejection of Claims 1-11 as Being Obvious

Claims 1-11 stand rejected as obvious and unpatentable over either JP 11-264037 or JP 61-266540. Claim 10 stands additional rejected over either of these two references, taken further in view of U.S. Patent No. 4,605,532 (Knorr et al.).

A. Teachings of JP 11-264037

This Japanese Patent Application is directed to a copper alloy foil that contains:

from 0.05% to 3.5% by weight of Fe;
from 0.01% to 0.4% by weight of P;
from 0.05% to 5% of Zn;
from 0.5% to 3% of Sn; and
from 0.01% to 2% Ni (among other elements)

This copper foil has sufficient strength and electrical conductivity and may be used for printed circuit boards and in semiconductor mounting. See Abstract on page 2 of English translation.

It is noted that the copper alloy produced has "sufficient strength and electrical conductivity". See page 8, lines 6 to 9.

While the manufacturing process for producing this alloy includes "an aging treatment [at 300 to 700°C] for the purpose of obtaining the desired strength and electrical conductivity". See pages 11 and 12 paragraphs [0017] and [0018]. No mention is made of relief annealing or the presently discovered and claimed advantages of enhanced resistance to stress relaxation. More importantly, this reference does not teach or suggest that this alloy has achieved a "relief annealing temper".

B. Teachings of JP 61-266540

This reference English abstract teaches a copper-based alloy useful for semiconductor lead frames that contain:

0.5-3% Fe
0.4 - 2% Ni
0.01-0.5% P
0.15-1.5% Sn

The abstract does not teach the presence of less than 0.2% Zn in its alloys.

While this English abstract teaches the alloy showed Vickers hardness 154 and electrical conductivity of 48% IACS, no mention is made of relief annealing or the presently discovered and claimed advantage of enhanced resistance to stress relaxation. More importantly, this reference does not teach or suggest that this alloy has achieved a "relief annealing temper".

C. Teachings of U.S. Patent No. 4,605,532

This Knorr et al. references teaches a copper base alloy which contains:
from 0.3 to 1.6% by weight iron; of which up to one-half can be replaced by Ni;
from 0.01 to 0.20% by weight Mg;
from 0.10 to 0.40% by weight P;
up to 0.5% by weight Sn; and with balance being Cu.

This reference makes no mention of the presence of Zn and also differs from the present invention in the percentage of tin (i.e. this reference teaches the presence of "up to 0.5% Sn" versus "0.6 to 1.4% tin" in claim 1 and narrower ranges in claims 6, 7 and 10).

Also, while this reference makes a statement that "alloys may be stress relief annealed" (see col. 6, lines 61-62) there are no specific mention of any conditions for doing so or any mention that having a relief annealing temper helps achieve enhanced resistance to stress relation. Furthermore, nowhere is there any mention of any of the alloys in this reference having relief annealing temper.

It is appreciated that the alloys of this Knorr et al. reference have the claimed properties of yield strength and electrical conductivity claimed in claim 10.

D. Differences Between the Present Claimed Invention and the Applied References

To summarize, JP 11-264037 differs from the presently claimed invention at least two ways: (1) it does not teach or suggest that its taught copper alloys may be relief annealed or achieve a relief annealing temper; and (2) it does not teach or suggest that its taught copper alloys possess enhanced resistance to stress relation.

JP 61-266540 differs from the presently claimed invention in at least three ways: (1) it does not teach or suggest that its alloys must have less than 0.2% Zn; (2) it does not teach or suggest that its copper alloys may be relief annealed or achieve a

relief annealing temper; and (3) it does not teach or suggest that its taught copper alloys possess enhanced resistance to stress relation.

Knorr et al. differs from the presently claimed invention in at least three (3) ways: (1) it does not teach or suggest copper alloys having "0.6 to 1.4% tin"; (2) it does not teach or suggest that the final alloys possess a relief annealing temper; and (3) it does not teach or suggest copper alloys having enhanced resistance to stress relaxation.

E. Response to The Patent Examiner's Comments

With regard to the obviousness rejection of claims 1-11 over either of the Japanese Published Patent Applications, the Examiner did not directly address the patentability of the relief annealing temper limitation. The Examiner merely stated in paragraph 12 that claims 21-24 were product-by-process claims, but did not address the patentability or non-patentability of this property in claims 1-11. With regard to claimed limitation "enhanced resistance to stress relaxation", the Examiner stated the following in paragraph 9 of the Final Rejection:

> The cited reference(s) disclose(s) the features including the claimed Cu base alloy composition, electrical conductivity, and/or tensile/hardness properties. The difference between the reference(s) and the claims are as follows: with respect to claim 10, that cited references do not disclose the remaining stress at 150°C after 3000 hours exposure. However, since the alloys of cited references have alloy composition and tensile property at an ambient temperature overlap the claimed alloy, it is believed that the remain stress at the claimed condition would be overlapped. Therefore, the burden is on the applicant to prove that the product of the prior art does not necessarily or inherently possess characteristics attributed to the claimed product. In re Spade, 911 F.2d 705, 708, 15 U.S.P.Q. 2d 1655, 1658 (Fed. Cir. 1990) and In re Best, 195 U.S.P.Q., 530 and MPEP 2112.01.

On page 11, of the English translation this Japanese Published Patent Application, it is stated that "(Mg, Co, Pb, Zr, Cr, Mn, Al, Ni, Si, In or B) all have the action of improving the strength of the aforementioned copper alloy". However, in Table 1, (see page 14 of the English translation), no actual Examples were conducted with nickel (Ni). Thus, the teachings this reference could not recognize that the

inclusion of nickel, along with a relief anneal temper, would produce the additional benefit of "enhanced resistance to stress relation".

Table 3 of the present specification contains a comparison of C19500 alloy (which contains Cobalt) has undesirable lower "Percentage Stress Remaining-Long." as compared to similar copper alloys that contain nickel instead (e.g. H898 and H899). Specially, at 125°C and 3000 hours, copper alloy H898-A which has been relief annealed (RA) has a percentage stress remaining-long of 87% whereas copper alloy C19500-RA has a corresponding lower value of 79%. Likewise, H898-B-RA has a corresponding value of 86%; H898-D-RA has a corresponding value of 87%; and H899-A-RA has a corresponding value of 83%. Thus, four nickel-containing alloys of the present invention have enhanced resistance to stress relaxation compared to a similar cobalt-containing copper alloy.

Moreover, it should be noted that a comparison of the "Percentage Stress Remaining-Long." in Table 3 (emphasis added) of the present specification between copper alloys that were not relief annealed (designed as "F") and those that were relief annealed (designated as "RA") clearly shows enhanced resistance stress relation in each case where relief annealing was employed (i.e. look at the two H898-A tests, the two H899-A tests and the two C-19500 tests). In each of these three side-by-side tests (with and without relief annealing), the same alloys that were relief annealed were higher (i.e. at 125°C and 3000 hours - 87% versus 72% for H898-A; 83% versus 70% for H899-A and 79% versus 65% for C19500). Accordingly, contrary to the Examiners comment, Table 3 does provide data that the present claimed copper alloys having a relief anneal temper provides enhanced resistance to stress resistance.

It is also noted that the Examiner did not comment on the differences in alloy constituents in JP 61-266540 and the Knorr et al. references.

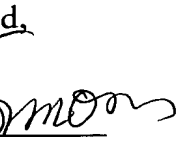
F. None of the Applied References Provide a Motivation to Have a Relief Annealing Temper on the Present Claimed Copper Alloys to Achieve the Desired Enhanced Resistance to Stress Relation Property

There is no teaching or suggestion in any of the three applied references to motivate the ordinarily skilled artisan to prepare the present claimed copper alloys with a relief annealing temper so as to achieve the desired property of enhanced resistance to stress relaxation.

CONCLUSION

Appellants respectfully request that the Board of Appeals reverse the outstanding rejections under 35 U.S.C. § 103 of instant claims 1-11 on appeal.

Respectfully submitted,
John F. Breedis et al.



July 21, 2003
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APPENDIX I – CLAIMS ON APPEAL

This listing of claims replaces all previous listing of claims in this case.

1. (Previously Amended) A copper alloy having enhanced resistance to stress relaxation consisting, by weight, essentially of:

from 0.8% to 3% of iron;

from 0.3% to 2% of nickel;

from 0.6% to 1.4% of tin;

from 0.005% to 0.35% of phosphorous;

less than 0.2% of zinc; and

the balance copper and inevitable impurities, said copper alloy having a relief anneal temper.

2. (Original) The copper alloy of claim 1 wherein said iron is present in an amount of from 1% to 2%.

3. (Original) The copper alloy of claim 2 wherein said iron is present in an amount of from 1% to 1.5%.

4. (Original) The copper alloy of claim 2 wherein said nickel is present in an amount of from 0.5% to 1.3%.

5. (Original) The copper alloy of claim 4 wherein said nickel is present in an amount of from 0.5% to 1%.

6. (Original) The copper alloy of claim 4 wherein said tin is present in an amount of from 0.7% to 1.1%.

7. (Original) The copper alloy of claim 6 wherein said tin is present in an amount of from 0.8% to 1%.

8. (Original) The copper alloy of claim 6 wherein said phosphorous is present in an amount of from 0.01% to 0.1%.

9. (Original) The copper alloy of claim 8 being formed into an electrical connector.

10. (Previously Amended) The copper alloy of claim 1 consisting, by weight, essentially of:

from 1% to 1.5% of iron;

from 0.5% to 1% of nickel;

from 0.8% to 1% of tin;

from 0.01% to 0.1% of phosphorous;

less than 0.2% of zinc; and

the balance copper and inevitable impurities, said alloy having a yield strength of 70 ksi or higher, an electrical conductivity in excess of 40% IACS.

11. (Previously Amended) The copper alloy of claim 10 formed into an electrical connector.

12. – 24. (Cancelled)